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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

Office Action Summary	Application No. 10/751,328	Applicant(s) XIE ET AL.	
	Examiner Said Broome	Art Unit 2628	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/1/06*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to an amendment filed on 11/2/2006.

2. Claims 1, 16, 33 and 34 have been amended by the applicant.

3. Claims 2-15 and 17-32 are original.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-23 and 33 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims 1, 16 and 33 recite computer-implemented methods, however the claims appear to be directed to an abstract idea rather then a practical application of the abstract idea. Therefore, the claimed invention does not posses "real world" value. The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a § 101 judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 6-11, 13, 23, 24, 27, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish et al. (hereinafter "Cornish", "*View-Dependent Particles for Interactive Non-Photorealistic Rendering*").

Regarding claim 1, Cornish teaches a rendered image that includes a geometric object and a particle system, in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*"), therefore it is apparent that a computer implemented method for generating an image for animation, as described in the abstract lines 7-13 ("*Our primary contribution is the use of a hierarchical view-dependent clustering algorithm to regulate the number and placement of these particles...and ensuring inter-frame coherence in animated or interactive rendering.*"), is utilized to describe the scene of rendered models and particles. Cornish teaches generating a plurality of cutout particles, each cutout particle corresponding to a geometric object in the scene description on section 1.1 lines 1-13 ("*View-dependent particles provide an efficient multiresolution structure for fine-grained control over the placement of strokes, and can be generated from any polygonal model.*"), where it is described that particles are associated with 3D models taken from a scene. Cornish teaches rendering the particle systems with the cutout particles to generate a particle image, wherein at least some cutout particles occlude particles of the particle systems in section 2, 4., lines 1-17 ("*...the screen-space particle data is used to guide the rendering of strokes into the image. Again, a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as*

well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes."), where it is described that a buffer is calculated to comprise pixel or buffer data for the cutout particles, which are represented as strokes, that block or occlude some regions of a geometric object during rendering. Though Cornish does not explicitly teach compositing a particle image, it would have been obvious to one of ordinary skill in the art that the data describing the pixels are occluded by particles, as described in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*"), which enables particle image data to be composited with the object and generate a composited image as shown in Figures 4 and 5.

Regarding claim 6, Cornish teaches for at least some of the particles of the particle systems and at least some of the cutout particles, performing a compositing operation to determine a coloring or an occluding effect of the particle on one or more pixels of the particle image in section 2, 4., lines 1-17 ("*...a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes.*") and in section 2, 2., lines 3-16 ("*...strokes are to be depth-buffered, so that particles on the far side of the object do not generate visible strokes in the final image...A user callback specifies how to render these polygons....the polygon rendering callback would disable lighting, enable depth buffering, set the color, and render all polygons for the object.*").

Regarding claims 7 and 27, Cornish teaches processing the compositing operation is performed for the particles from the farthest particle from a camera position to the nearest particle on page 4 left column first paragraph lines 3-7 ("*...the distribution of particles can account for view-dependent factors, such as the distance of particles from the viewer...*").

Regarding claim 8, Cornish teaches the particles of the particle systems have coloring effects on at least one pixel of the particle image and the cutout particles have occluding effects on at least one pixel of the particle image, a coloring effect tending to accumulate color for the pixel and an occluding effect tending to block any accumulated color for the pixel in section 2, 4., lines 1-17 ("*...a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes.*") and in section 2, 2., lines 3-16 ("*...strokes are to be depth-buffered, so that particles on the far side of the object do not generate visible strokes in the final image...A user callback specifies how to render these polygons....the polygon rendering callback would disable lighting, enable depth buffering, set the color, and render all polygons for the object.*").

Regarding claims 9 and 28, though Cornish does not explicitly teach combining the particles from the particle systems and the cutout particles into a list, sorting the list by each particle's distance from a camera position, it would have been obvious to one of ordinary skill in the art at the time of invention that the depth buffer used to stored data relating to which particle occludes polygon data, as described on page 4 left column second paragraph lines 9-11 ("*...a depth buffer of the surface may be wanted to eliminate particles that should be occluded.*") and

in section 2, 2., lines 3-16 ("*...strokes are to be depth-buffered, so that particles on the far side of the object do not generate visible strokes in the final image...the polygon rendering callback would...enable depth buffering...*"), and therefore would be utilized to provide data describing particles from farthest to nearest thereby enabling only the nearest visible particles to be rendered which increases the processing speed. Cornish also teaches determining a coloring or an occluding effect of the particle on one or more pixels of the particle image in section 2, 4., lines 1-17 ("*...a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes.*").

Regarding claims 10 and 29, Cornish teaches combining the coloring effects of the particles of the particle systems and the occluding effects of the cutout particles to determine the color for a plurality of pixels in the particle image in section 2, 4., lines 1-17 ("*...a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes.*"), where it is described that the color of the particle is determined based on the occluding effect of the particle.

Regarding claim 11, Cornish teaches resolving the coloring effects of the particles of the particle systems and the occluding effects of the cutout particles based on the depth of the associated particles in section 2, 2., lines 3-16 ("*...strokes are to be depth-buffered, so that particles on the far side of the object do not generate visible strokes in the final image...A user*

callback specifies how to render these polygons....the polygon rendering callback would disable lighting, enable depth buffering, set the color, and render all polygons for the object.").

Regarding claim 13, Cornish teaches for each particle, determining which pixels in the particle image the particle covers and an amount of the pixel covered, as seen from a camera position on page 4 left column first paragraph lines 3-7 ("*...the distribution of particles can account for view-dependent factors, such as the distance of particles from the viewer...*").

Regarding claim 23, Though Cornish does not explicitly teach a computer program product comprising a computer-readable medium containing computer code, it is obvious form the description in section 4 lines 3-6 ("*It should be emphasized again that the system is fully interactive. The effects and models shown ran at frame rates ranging from 5-20 Hz on an SGI Onyx2 with InfiniteReality graphics.*") that the particles are rendered on a computer system using graphics software that is inherently stored on some computer-readable medium during execution.

Regarding claims 24, Cornish teaches a rendered image that includes a geometric object and a particle system, in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*") and in section 4 lines 3-6 ("*The effects and models shown ran at frame rates ranging from 5-20 Hz on an SGI Onyx2 with InfiniteReality graphics.*"), therefore it is apparent that a computer system provides a description of the scene of rendered models and particles, as described in section 1.1 1st paragraph lines 8-10 ("*...a new representation for the particle field, which we call view-dependent particles.*"). Cornish teaches generating geometric models in the scene description on pg. 2 right column 1st paragraph lines 2-3 ("*We represent the object to be rendered as a densely sampled polygonal model...*"). Cornish also teaches

generating a plurality of cutout particles, each cutout particle corresponding to a geometric object in the scene description on section 1.1 lines 1-13 ("*View-dependent particles provide an efficient multiresolution structure for fine-grained control over the placement of strokes, and can be generated from any polygonal model.*"), where it is described that particles are associated with 3D models taken from a scene. Cornish teaches rendering the particle systems with the cutout particles to generate a particle image, wherein at least some cutout particles occlude particles of the particle systems in section 2, 4., lines 1-17 ("*...the screen-space particle data is used to guide the rendering of strokes into the image. Again, a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes.*"), where it is described that a buffer is calculated to comprise pixel or buffer data for the cutout particles, which are represented as strokes, that block or occlude some regions of a geometric object during rendering. Though Cornish does not explicitly teach compositing a particle image, it would have been obvious to one of ordinary skill in the art that the data describing the pixels are occluded by particles, as described in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*"), which enables particle image data to be composited with the object and generate a composited image as shown in Figures 4 and 5. Though Cornish does not explicitly teach a geometry renderer, particle generator, particle renderer or compositer it is obvious that the methods taught by Corinsh, as described above, are

executed on a computer system. Therefore it is obvious to one of ordinary skill in the art that processing unit or components are comprised on that computer system to perform the methods.

Claims 2, 25 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish et al. (hereinafter "Cornish", "*View-Dependent Particles for Interactive Non-Photorealistic Rendering*") in view of Curtis ("*Non-Photorealistic Animation*").

Regarding claim 2, Cornish fails to teach the limitations. Curtis teaches rendering the geometric objects to produce a depth map, on page 15 appendix A first paragraph lines 1-3 ("*...draws the visible silhouette edges of a 3-D model using image processing and a stochastic, physically-based particle system. For input, it requires only a depth map of the model...*"). Though Curtis does not explicitly teach entries into the depth map, it would have been obvious to one of ordinary skill in the art at the time of invention to produce entries from the pixels visually represented in the depth map images that each indicate a distance to a nearest geometric object from a camera position in a particular direction, as illustrated in Figures A1 and B1. Curtis also teaches generating cutout particles from at least some of the entries in the depth map, each cutout particle corresponding to an entry in the depth map in three-dimensional space, on page 15 appendix A first paragraph lines 1-3 – fourth paragraph lines 1-3 ("*For input, it requires only a depth map of the model...First, the depth map is converted into two images...Next, particles are generated, one at a time, for a fixed number of particles...*"). It would have been obvious to one of ordinary skill in the art to combine the teachings of Cornish with Curtis because this combination would provide efficient rendering of a composited image through determining which portions of a mode are occluded by particles using a depth map.

Regarding claim 25, Cornish fails to teach the limitations. Curtis teaches rendering the geometric objects to produce a depth map, on page 15 appendix A first paragraph lines 1-3 ("*...draws the visible silhouette edges of a 3-D model using image processing and a stochastic, physically-based particle system. For input, it requires only a depth map of the model...*"). Curtis also teaches generating cutout particles from the depth map, on page 15 appendix A first paragraph lines 1-3 – fourth paragraph lines 1-3 ("*For input, it requires only a depth map of the model...First, the depth map is converted into two images...Next, particles are generated, one at a time, for a fixed number of particles...*"). The motivation to combine the teachings of Cornish with Curtis is equivalent to the motivation of claim 2.

Regarding claim 32, Cornish fails to teach the limitations. Curtis illustrates a rendered depth map image accompanying the geometric object in Figure B1. The motivation to combine the teachings of Cornish with Curtis is equivalent to the motivation of claim 2.

Regarding claim 34, Cornish teaches a rendered image that includes a geometric object and a particle system, in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*") and in section 4 lines 3-6 ("*The effects and models shown ran at frame rates ranging from 5-20 Hz on an SGI Onyx2 with InfiniteReality graphics.*"), therefore it is apparent that a computer system provides a description of the scene of rendered models and particles, as described in section 1.1 1st paragraph lines 8-10 ("*...a new representation for the particle field, which we call view-dependent particles.*"). Cornish teaches generating geometric models in the scene description on pg. 2 right column 1st paragraph lines 2-3 ("*We represent the object to be rendered as a densely sampled polygonal model...*"). Cornish teaches generating an

image that represents the view from the camera location on page 4 left column first paragraph lines 3-7 ("*...the distribution of particles can account for view-dependent factors, such as the distance of particles from the viewer...*"). Cornish also teaches generating a plurality of cutout particles, each cutout particle corresponding to a geometric object in the scene description on section 1.1 lines 1-13 ("*View-dependent particles provide an efficient multiresolution structure for fine-grained control over the placement of strokes, and can be generated from any polygonal model.*"), where it is described that particles are associated with 3D models taken from a scene. Cornish teaches rendering the particle systems with the cutout particles to generate a particle image, wherein at least some cutout particles occlude particles of the particle systems in section 2, 4., lines 1-17 ("*...the screen-space particle data is used to guide the rendering of strokes into the image. Again, a user-defined callback performs the rendering, parsing the feedback buffer to extract the particle position as well as any color or vector data...to render the underlying polygonal model, the same buffer is used for the final image...strokes can outline a filled object, or the depth buffer can prevent rendering occluded strokes.*"), where it is described that a buffer is calculated to comprise pixel or buffer data for the cutout particles, which are represented as strokes, that block or occlude some regions of a geometric object during rendering. Though Cornish does not explicitly teach compositing a particle image, it would have been obvious to one of ordinary skill in the art that the data describing the pixels are occluded by particles, as described in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*"), which enables particle image data to be composited with the object and generate a composited image as shown in Figures 4 and 5. Though Cornish does not explicitly teach a

geometry renderer, particle generator, particle renderer or compositer it is obvious that the methods taught by Corinsh, as described above, are executed on a computer system. Therefore it is obvious to one of ordinary skill in the art that processing unit or components are comprised on that computer system to perform the methods. However, Cornish fails to teach generating a depth map image for the geometric object and corresponding entries in the depth map for particles. Curtis illustrates accompanying depth map for the geometric model in Figure B1. Curtis also teaches generating cutout particles from at least some of the entries in the depth map, each cutout particle corresponding to an entry in the depth map in three-dimensional space, on page 15 appendix A first paragraph lines 1-3 – fourth paragraph lines 1-3 ("*For input, it requires only a depth map of the model…First, the depth map is converted into two images…Next, particles are generated, one at a time, for a fixed number of particles…*").The motivation to combine the teachings of Cornish with Curtis is equivalent to the motivation of claim 2.

Claims 12 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Kumar et al. (hereinafter "Kumar", "*The SunSaver: An OpenGL Visualization of the Sun's Surface*").

Regarding claims 12 and 31, Cornish fails to teach the limitations. Kumar teaches alpha blending the particle image with a rendered image of the geometric objects on page first paragraph lines 1-6 ("*…alpha blending our particles with the polygons on the surface…*"). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Cornish with Kumar because this combination would provide a smoothly generated

composited image, as taught by Cornish, by using an alpha blending technique of particles known in the art, as taught by Kumar.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of van Wijk ("*Rendering Surface-Particles*").

Regarding claims 14 and 15, Cornish fails to teach the limitations. Van Wijk teaches computing a depth of field adjustment, on page 58 section 4.1 right column second paragraph lines 8-10 ("*Motion blurs turns the images of the particles in short lines…*"), and a motion blur adjustment, in section 4.3 fist paragraph lines 8-11 ("*…a more flexible technique would be welcome that allows the user to focus on areas of interest…*") and page 60 section 4.3 second paragraph lines 1-3 ("*The effect of depth of field as a tool for the selection of interesting areas is the strongest f put under user control.*"), for a particle. It would have been obvious to one of ordinary skill in the art to combine the teachings of Cornish with van Wijk because this combination would provide a reduction in undesired artifacts present in images composited of particles and geometric models.

Claims 16-18 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Blinn (US Patent 6,184,891).

Regarding claims 16 and 30, Cornish teaches a computer-implemented method to produce a particle image to be combined with a second image in the abstract lines 3-6 ("*…we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*"), where it is described that the particles

are combined with the geometric object, which would be implemented in animation, as described in the abstract lines 7-13 ("*Our primary contribution is...to regulate the number and placement of these particles...and ensuring inter-frame coherence in animated or interactive rendering.*"). Cornish teaches generating a plurality of cutout particles, each cutout particle corresponding to a geometric object in the scene description on section 1.1 lines 1-13 ("*View-dependent particles provide an efficient multiresolution structure for fine-grained control over the placement of strokes, and can be generated from any polygonal model.*"), where it is described that particles are associated with 3D models taken from a scene. However, Cornish fails to teach computing a list of overage layers and determining the color of the pixels based on their associated coverage layer list. Blinn teaches computing a list of coverage layers for the pixel in column 6 lines 66-67 – column 7 lines 1-3 ("*The method for simulating fog described above can be used in complex scenes with several layers of objects and fog...fog enclosing objects in a graphics scene can be modeled with fog layers.*") and in column 4 lines 30-36 ("*...this fog method is applied after computing the color of the pixel being fogged. The fogged pixel can then be composited with another pixel at the same location. This method applies particularly well to a layered graphics rendering pipeline where geometry in a graphics scene is rendered to separate image layers...*"), where each coverage layer in the list of coverage layers includes an accumulated color value due to one or more particles of a particle system and an amount occluded by one or more of the cutout particles, as described in column 3 lines 10-12 ("*The fog is represented as a scattering of dots (e.g., 48) of color F and an amount f(z) corresponding to the fog between the viewpoint and the depth value (z) of the pixel.*") and in column 10 lines 58-61 ("When placed over the background color F, the proper amount of *f* shows through to account for the fog color in front of

A, i.e. *j*F, as well as the amount of fog peeking through the fogged A…"), where it is described that several coverage layers are produced for the pixels in the scene, where each image layer includes the contributing color values based on the visibility of the pixels occluded by the particles of fog. It would have been obvious to one of ordinary skill in the art to combine the teachings of Cornish with Blinn because this combination would provide accurate rendering of composited particles and geometric primitives through the determination of the color associated with the visible pixels in the composited image from image layers.

Regarding claim 17, Cornish fails to teach the limitations. Blinn teaches that each list of coverage layers is generated by processing the particles in order from farthest from a camera position to nearest in column 8 lines 60-67 – column 9 lines 1-10 ("…*objects like A that are partially occluded by other objects (e.g., B) are fogged using a fog layer having a fog amount f, the fog amount from the viewpoint all the way to A…the fogged objects A and B can be rendered to separate image layers and composited later to construct an output image*…"), where it is described that the collection of layers are generated by processing the particles, or fog, in order of visibility form a camera potion or viewpoint, as shown in Figure 6. The motivation to combine the teachings of Cornish with Blinn is equivalent to the motivation of claim 16.

Regarding claim 18, Cornish fails to teach the limitations. Blinn teaches adding a new coverage layer, or image layer, for a particle from a particle system, such as fog, that follows a cutout particle in the processing in column 9 lines 11-21 ("…*simulating fog on two objects A and B can be extended to an arbitrary number of layers of fogged objects. FIG. 6 extends the example in FIG. 5 by adding another object C (170) with a fog layer 172 of amount j in front of C…The new fog layer jF and object C can be overlaid on the combined layer P using the over*

operator..."), where it is described that a new layer jF is added on top of the existing layer P that contains the visibility and color contribution information of the particles that occlude objects A and B, as shown in the transition from Figure 5 to Figure 6.

Claims 3, 5, 20-22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Blinn in further view of Klassen (US Patent 6,591,020).

Regarding claims 3, 5, 20-22 and 26, Cornish fails to teach the limitations. Blinn teaches performing anti-aliasing techniques for the rendered particles of fog in column 12 lines 12-18 ("*...the stages of the graphics rendering pipeline, including traversing the scene database...antialiasing, shading, fog, and texture mapping...*) are performed by software modules executing on a computer."), however Blinn fails to teach that the portions of these particles are generated at a higher resolution where aliasing is likely to occur. Klassen teaches in column 2 lines 12-19 ("*...the edges between the overlapping or abutting objects may appear jagged. Therefore, it is often desirable to antialias these edges...Antialiasing provides the illusion of increased resolution...*"), that portions of an image that present undesired effects, such as aliasing, may be rendered at a higher resolution that the rest of the image, thereby preventing unwanted artifacts in the final image. It would have been obvious to one of ordinary skill in the art to combine the teachings of Cornish, Blinn and Klassen because this combination would provide smooth realistic images by preventing aliasing effects that may present in the image by enabling certain portions of the image to be generated at a higher resolution.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Govindaraju ("*Interactive shadow generation in complex environments*").

Regarding claim 4, Cornish fails to teach the limitations. Govindaraju teaches generating pixels at a higher resolution at silhouette edges of the depth map in section 2.1 3rd paragraph lines 1-2, 7-9 ("*Many techniques have been proposed to handle aliasing of shadow edges…to increase the effective shadow map resolution in areas where edge aliasing occurs.*"). Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Cornish with Govindaraju this combination would provide a composited image, as taught by Cornish, which would be free of aliasing artifacts through the higher resolution applied to the edges of the depth or shadow map, as taught by Govindaraju.

Claim Objections

Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 11/2/2006 have been fully considered but they are not persuasive.

The applicant argues the 35 U.S.C. 101 rejection of claims 1-23 and 33 on page 8 3rd paragraph lines 1-2 of the applicant's Remarks that the claims produce a tangible result of an animated image. However, the claims are directed to an abstract idea rather than a practical

application of the abstract idea. Even though preamble now recites for animation, the claimed invention does not recite animating the image on a display, therefore the claims do not produce a tangible result.

The applicant argues that the reference Cornish used in the 35 U.S.C. 103(a) rejection of claim 1 does not teach cutout particles corresponding to a geometric object. The examiner maintains the rejection because Cornish teaches cutout particles corresponding to a geometric object in section 1.1 lines 1-13 ("*View-dependent particles provide an efficient multiresolution structure for fine-grained control over the placement of strokes, and can be generated from any polygonal model.*") and in the abstract lines 4-7 ("*...a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*"), where the cutout particles, which are represented as strokes, are placed over a corresponding geometric polygon model.

The applicant argues that the reference Cornish used in the 35 U.S.C. 103(a) rejection of claim 1 does not teach occlusion of particles of the particle system. The examiner maintains the rejection because Cornish teaches in the abstract lines 7-9 - 13-15 ("*Our primary contribution is the use of a hierarchical view-dependent clustering algorithm to regulate the number and placement of these particles... View-dependent callback functions determine which particles are rendered and how to render the associated strokes.*") and in section 2, 4., lines 1-17 ("*...the screen-space particle data is used to guide the rendering of strokes into the image...the depth buffer can prevent rendering occluded strokes.*"), where it is described that cutout particles, or stokes, which are associated with particles may be occluded, therefore the cutout particles would occlude at least some of the associated particles.

The applicant argues that the reference Cornish used in the 35 U.S.C. 103(a) rejection of claim 1 does not teach compositing particles with geometric objects. The examiner maintains the rejection because Cornish teaches compositing strokes, or cutout particles with associated particles, with polygon models in the abstract lines 3-6 ("*...we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*") and lines 13-15 ("*... View-dependent callback functions determine which particles are rendered and how to render the associated strokes.*"), where it is described that the particles are rendered over a geometric object, and tare therefore composited with the polygon models, as shown in Figures 1 and 3.

The applicant argues that the reference Kumar used in the 35 U.S.C. 103(a) rejection of claims 12 and 31 does not teach all important aspects of claim 1. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Said Broome whose telephone number is (571)272-2931. The examiner can normally be reached on 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

S. Broome SB
1/5/07

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER